

Claims:

1. Process for manufacturing transglycosylation products, according to which process

- a starch derivative is reacted at acidic conditions with an alkanol containing 1 – 6
- 5 hydroxyl groups, and
- the reaction product is recovered as such or it is subjected to further processing,
- characterized in that
- the transglycosylation reaction between the starch derivatives and the alkanol is carried out in a reactive extrusion process.

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2. The process according to claim 1, characterized in that the reaction is carried out essentially without any liquid mediums.

3. The process according to claim 1 or 2, characterized in that the starch derivative, the alkanol and an acidic catalyst are used to form a mixture, which is fed into an extrusion device, in which mechanical energy and heat are supplied to the mixture, and the transglycosylation reaction is continued in the extrusion device until a polymer melt is obtained as a result.

20 4. The process according to any of claims 1 to 3, characterized in that the reaction mixture is conducted through the extrusion device via at least two, separately adjustable heating zones, enabling control over the amount of heat introduced externally into the reaction mixture.

25 5. The process according to any of the preceding claims, characterized in that the extrusion temperature is within the range of approx. 105 to 200 °C, preferably within the range of approx. 110 to 190 °C.

30 6. The process according to any of the preceding claims, characterized in that, prior to performing the transglycosylation reaction, the alkanol and the acidic substance are mixed together to form a mixture, and an aerosol is produced from this mixture, and the aerosol is added to the starch derivative at a dose corresponding to the desired molar mass of the end product to produce a pre-mixture.

7. The process according to claim 6, characterized in that the amount of alkanol is approx. 0.01 to 20 weight-%, preferably 0.1 to 10 weight-%, of the mass of the starch derivative, and the amount of the alkanol is approx. 0.0005 to approx. 5 mole-%, preferably approx. 0.002 to approx. 2.0 mole-%, in particularly approx 0.015 to 0.3 mole-%, of the amount of the starch derivative used.

8. The process according to claim 6 or 7, characterized in that the alkanol and the acidic substance are fed in aerosol form into a fluidised-bed type of a mixing device, in which they are mixed with a powdery starch derivative to produce the pre-mixture.

10 9. The process according to any of claims 6 to 8, characterized in that the concentrations of alkanol and the acidic substance and of any liquid chemicals are selected such that the total amount of liquid will be less than 30 %, preferably approx. 5 to 25 %, of the dry matter content of the pre-mixture containing the starch derivative.

15 10. The process according to any of claims 5 to 9, characterized in that the reaction mixture is compacted and, where necessary, granulated prior to feeding it into the extrusion device.

20 11. The process according to claim 10, characterized in that the compacted pre-mixture is fed into the extruder to serve as reaction mixture, the extruder being of either the 1- or 2-screw type.

25 12. The process according to any of the preceding claims, characterized in that the starch derivative comprises a product manufactured from native starch by means of oxidizing, hydrolyzing, cross-linking, cationizing, grafting, etherification or esterification.

13. The process according to claim 12, characterized in that the starch derivative is a starch ester or starch ether.

30 14. The process according to any of the preceding claims, characterized in that the alkanol used is a lower alkanol with 1 to 6 carbon atoms, and 1 to 5, preferably 1 to 3, hydroxyl groups.

15. The process according to claim 14, characterized in that the alkanol is methanol, ethanol, n-propanol, isopropanol, n-butanol and sec. butanol, a substituted lower alcohol, e.g. metoxy ethanol, etoxy ethanol, metoxy methanol or etoxy methanol, or an alcohol containing 2 or 3 hydroxyl groups, e.g. ethylene glycol, propylene glycol or glycerol.

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16. The process according to any of the preceding claims, characterized in that the acid catalyst used is a strong mineral acid, such as sulphuric acid, hydrochloric acid, nitric acid, strong organic acid, such as paratoluene sulphonic acid, methane sulphonic acid, benzene sulphonic acid or trifluoromethane sulphonic acid or mono- or polyalkylated aryl mono- or polysulphonic acid, such as xylene sulphonic acid or cumene sulphonic acid or dodecyl benzene sulphonic acid, or an acidic ion exchange resin.

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17. The process according to any of claims 1 to 15, characterized in that the acidic catalyst used is a phosphorus-containing acid, such as phosphoric acid, H_3PO_4 , hypophosphorous acid, H_3PO_2 , or phosphorous acid, H_3PO_3 .

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18. The process according to claim 1, characterized in that the catalyst is allowed to chemically bond with the transglycosylation product.

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19. The transglycosylation product of a starch derivative, which product contains anions derived from a phosphorus-containing acid, which is chemically bonded to the product.

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20. The product according to claim 19, characterized in that it has been produced in accordance with claim 18.

21. The use of a product according to claim 19 as a starting material for polymers.